

**Claims**

1. An isolated Nod-factor binding element comprising one or more isolated NFR polypeptide having a specific Nod-factor binding property, or a functional fragment thereof, wherein the NFR amino acid sequence is at least 60% identical to any one of SEQ ID NO: 8, 15 or 25.
2. The Nod-factor binding element of claim 1, wherein said NFR polypeptide is NFR1, comprising the amino acid sequence selected from the group consisting of SEQ ID No: 24, 25, 52 and 54.
3. The Nod-factor binding element of claim 1, wherein the NFR polypeptide is NFR5 comprising an amino acid sequence selected from the group consisting of SEQ ID No: 8, 15, 32, 40 and 48.
4. The Nod-factor binding element of claim 1, comprising a NFR1 polypeptide or a functional fragment thereof, having the amino acid sequence selected from the group consisting of SEQ ID No: 24, 25, 52 and 54, and a NFR5 polypeptide or a functional fragment thereof, having an amino acid sequence selected from the group consisting of SEQ ID No: 8, 15, 32, 40 and 48.
5. An isolated nucleic acid molecule encoding a NFR polypeptide according to claim 1, wherein the NFR amino acid sequence is at least 60% identical to either of SEQ ID NO: 8, 15 or 25.
6. An isolated nucleic acid molecule encoding a NFR 1 polypeptide according to claim 2, comprising the amino acid sequence selected from the group consisting of SEQ ID No: 24, 25, 52 and 54.

7. An isolated nucleic acid molecule encoding a NFR 5 polypeptide according to claim 3, comprising an amino acid sequence selected from the group consisting of SEQ ID No: 8, 15, 32, 40 and 48.
- 5 8. An isolated nucleic acid molecule which encodes a NFR1 polypeptide having a specific Nod-factor binding property, and which hybridises with a nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of SEQ ID No: 21, 22, 23, 51 and 53 under stringency conditions of no less than about 1.0xSSC at 65°C.
- 10 9. An isolated nucleic acid molecule which encodes a NFR5 polypeptide having a specific Nod-factor binding property, and which hybridises with a nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of SEQ ID No: 6, 7, 11, 12, 39 and 47 under stringency conditions of no less than about 1.0xSSC at 65°C.
- 15 10. An expression cassette comprising a nucleic acid molecule according to any one of claims 5 to 9.
- 20 11. The expression cassette of claim 10, wherein the nucleic acid molecule encoding a NFR polypeptide is operably linked to a transcriptional regulatory element.
- 25 12. A vector comprising the expression cassette of claim 11.
13. A cell that is stably transformed with the expression cassette of claim 11.
- 30 14. The cell according to claim 13, wherein said cell is a plant cell.

15. A method of producing a plant expressing a Nod-factor binding element, the method comprising introducing into the plant a transgenic expression cassette comprising a nucleic acid sequence encoding a NFR polypeptide according to any one of claims 5 to 9, wherein the nucleic acid sequence is operably linked to a promoter and selecting transgenic plants and their progeny expressing said NFR polypeptide.
16. The method of claim 15, wherein the transgenic expression cassette is introduced into the plant through a sexual cross.
17. The method of claim 15, wherein said promoter is a native or heterologous root specific promoter.
18. The method of claim 15, wherein said promoter is a native or heterologous constitutive promoter.
19. A transgenic plant expressing one or more NFR polypeptides produced according to the method of any one of claims 15 to 18.
20. The transgenic plant of claim 19, expressing the Nod-factor binding element according to any one of claims 1 to 4, and having a specific Nod-factor binding property.
21. The transgenic plant of claim 19 or 20, wherein the plant is a non-nodulating dicotyledenous plant.
22. The transgenic plant of claim 19 or 20, wherein the plant is a monocotyledonous cereal.
23. A method for marker assisted breeding of *NFR* alleles, encoding variant NFR polypeptides, comprising the steps of:

- 5           a. identifying in a nodulating legume species a variant *NFR* polypeptide having specific Nod-factor binding properties and having an amino acid sequence substantially similar to a sequence selected from the group consisting of SEQ ID No: 8, 15, 24, 25, 32, 40, 48, 52 and 54, and
- b. determining the nodulation frequency of legume plants expressing said variant *NFR* polypeptide, and
- c. identifying a DNA polymorphism at a locus genetically linked to or within the allele encoding said variant *NFR* polypeptide, and
- 10          d. preparing a molecular marker based on said DNA polymorphism, and
- e. using said molecular marker for the identification and selection of a plant carrying an *NFR* allele encoding said variant *NFR* polypeptide.

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24. A plant selected according the method of claim 23, carrying a *NFR* allele encoding a variant *NFR* polypeptide.

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25. Use of the method of claim 23 for breeding a plant with enhanced nodulation frequency and/or root nodule occupancy and/or enhanced symbiotic nitrogen fixation ability.

26. A use according to claim 25, wherein said plant is a legume.